

ABSTRACT OF THE DISCLOSURE

An objective is to provide an insulating film suitable for a semiconductor device, typically a TFT, and a method of manufacturing the insulating film. A semiconductor device using this type of insulating film for a gate insulating film, a base film, and a protective insulating film or an interlayer insulating film, and a method of its manufacture, are provided. The insulating film is manufactured from a hydrogenated silicon oxynitride film by plasma CVD using SiH_4 , N_2O , and H_2 as raw material gasses. It has a composition in which the oxygen concentration is set from 55 to 70 atomic%, the nitrogen concentration is set from 0.1 to 6 atomic%, preferably between 0.1 and 2 atomic%, and the hydrogen concentration is set from 0.1 to 3 atomic%. In order to make a film with this composition, the substrate temperature is set from 350 to 500°C, preferably between 400 and 450°C, and the electric discharge power density is set between 0.1 and 1 W/cm².